One-step electrochemical synthesis of MoS2/graphene composite for supercapacitor application

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ABSTRACT

In this study, an MoS2/graphene composite is fabricated from bulk MoS2 and graphite rod via a facile electrochemical exfoliation method. The as-prepared samples are characterized by X-ray diffraction, field emission scanning electron microscopy, Fourier transform infrared spectroscopy and ultraviolet-visible spectroscopy techniques to confirm the formation of the MoS2/graphene composite. The electrochemical behavior of the MoS2/graphene composite is evaluated through cyclic voltammetry, galvanostatic charge/discharge and electrochemical impedance spectroscopy. It exhibits high specific capacitance of 227 F g−1 as compared with the exfoliated graphene (85 F g−1) and exfoliated MoS2 (70 F g−1) at a current density of 0.1 A g−1. This can be attributed to the synergistic effect between graphene and MoS2. Moreover, it displays high electrochemical stability and low electrical resistance.

KEYWORDS

Electrochemical exfoliation; Supercapacitors; Graphene; Exfoliated MoS2; 2D materials

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